National eye health data from the Hungary’s Comprehensive Health Protection Screening Program 2010–2020–2030 (MÁESZ)

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ABSTRACT

Purpose: This paper provides a detailed presentation of the estimated number of people in Hungary with eye disease and refractive errors by both sex and age. Materials/methods: In the past 12 years, 168,522 people (54.1% women and 45.9% men) have been screened under Hungary’s Comprehensive Health Protection Screening Programme (MÁESZ). Results: The total number of people with eye disease in the adult Hungarian population (about 8 million people) is estimated to be 1,684,818, with women (1,078,026) outnumbering men (606,792). Eye diseases were found to be more common in older age groups, and more common in women than men in each age group. The estimated number of people with refractive errors in the Hungarian adult population is 5,005,095. The overall number of people with myopia in the adult Hungarian population is estimated to be 3,058,536, with roughly equal numbers of men and women. The majority of people with myopia (63.3%) are between 18 and 45 years of age. Conclusions: The huge number of people in the Hungarian population affected by eye disease or refractive errors underscores the need to develop and implement an effective national strategy and specific programmes to prevent visual impairments.

KEYWORDS
eye disease, refractive errors, myopia, screening, national health programmes

INTRODUCTION

The problem of eye disease and refractive errors was given new emphasis in October 2019, when the World Health Organization (WHO) published the World Report on Vision [1], its programme for the current decade. According to the WHO report and the publications of the Vision Loss Expert Group of the Global Burden of Disease Study, eye disease and refractive errors are affecting an increasing number of people worldwide, because, while the prevalence of blindness and vision impairment is decreasing, the population is growing at a faster rate [1–3].

Unfortunately, there are few data from Europe, including Hungary, on the ocular health of the population [4–9], thus the data obtained during Hungary’s Comprehensive Health Protection Screening Programme (MÁESZ) and their processing are important [10].

Under the MÁESZ, a considerable number of people have undergone tests over the last 12 years, including ophthalmological interviews and examinations [10]. We have already published some of the ophthalmological findings in earlier papers in English and Hungarian [11–14]. In the present paper, we focus on the size of the populations affected by eye disease and refractive errors.
MATERIALS AND METHODS

The MÁESZ eye examinations were carried out on 168,522 individuals (54.1% women and 45.9% men) between 1 January 2011 and 1 August 2022. The ratio of women to men was found to be similar in the sample population and in the corresponding national population over the age of 18 (53.0% women and 47.0% men). By comparison with the national age distribution, the 26 to 40 age group was somewhat overrepresented in the sample, while the 61 years and above age group was underrepresented. A more extensive description of the study sample can be found in one of our earlier articles [11–13].

As part of the ophthalmology programme, the screening participants were asked whether they had an eye disease, and the answer was recorded.

The prevalence of refractive errors was calculated using refraction measurements carried out on 94,618 participants (50,178 women and 44,440 men) who took part in the nationwide screening programme between 2014 and 2022. Refractive errors were measured and classified in the following manner: The refraction of the eyes (spherical and cylindrical dioptres [D]) was measured without pupil dilation using a PRK-6000 Auto Ref-Keratometer (Potec, Daejeon, South Korea), and the spherical equivalent (SEQ) was computed for both eyes based on the measured spherical and cylindrical values. Myopia was defined as having a SEQ value of $-0.5$ D or below, and hypermetropia (hyperopia) as having a SEQ value of $+0.5$ D or above.

The number of people with eye disease and the number of people with myopia for each age group and for both sexes were estimated using the following equation: (number of persons affected in the sample)/(total number of subjects in the sample) × (total number of persons in the population in the same age group). Data for the Hungarian adult population by age and sex were taken from the national database of the Hungarian Central Statistical Office as of 2018 (3,790,916 men and 4,272,342 women).

RESULTS

The overall number of people with eye disease in the adult Hungarian population is estimated to be 1,684,818 (606,792 men and 1,078,026 women). Figure 1 shows their age distribution.

The estimated number of people with refractive errors in the Hungarian adult population is 5,005,095. The distribution of refractive errors in the sample population is close to the normal Gaussian distribution, although with some bias to the left (a greater spread to the left) indicating more people with myopia than hypermetropia, and not only a greater number but also with a greater dioptre range (Fig. 2). The relative distribution of myopia was similar in men and women (43.4% in both sexes), although slight differences were found in emmetropia (42.5% for men and 38.2% for women) and hypermetropia (14.0% for men and 18.3% for women).

The mean refractive errors (SEQ) for the different age groups are shown in Fig. 3.

The estimated total number of people with myopia in the adult Hungarian population is 3,058,536 (1,440,452 men and 1,618,084 women). Their age distribution is shown in Fig. 4. The majority of people with myopia (63.3%) are between 18 and 45 years of age (66.7% men and 60.4% women).

DISCUSSION

The results of our wide-scale data collection indicate that as many as one in every five people in the Hungarian adult population has an eye disease. According to the findings of
our earlier Rapid Assessment of Avoidable Blindness (RAAB) study, the leading causes of blindness and severe visual impairment in Hungary are age-related macular degeneration (AMD), diabetic retinopathy (DR), other posterior segment diseases, cataracts, and glaucoma [6]. It is generally recognised that eye diseases that result in impaired vision have a significant negative impact on health-related quality of life, thus public education about the risks and prevention of blindness should be increased to prevent these negative effects [15].

In the present study, eye diseases were found to be nearly three times more frequent in older age groups. In Finland, the prevalence of eye diseases has also been found to be greater among the elderly [15]. The most serious eye diseases causing blindness, including AMD, DR, cataracts, and glaucoma, are all age related. The prevalence of irreversible vision loss or blindness in the United States is higher among those over the age of 60 [16, 17]. The prevalence of AMD in the United States, for example, rises from 2.02 to 11.57% between the ages of 40 and 64, reaching 60.35% between the ages of 95 and 99 [16, 17]. A meta-analysis found that the prevalence of AMD increases exponentially with age in populations of European ancestry [18]. By the age of 60, the frequency of open-angle glaucoma in Europe approaches 2%, and by the age of 85 it exceeds 7% [19]. There are specific screening and treatment options for these diseases, which, if used in time, can prevent visual impairments. It is crucial to provide people with knowledge of early warning signs and/or the importance of regular eye screening.
In Hungary, we found that women were more prone to eye disease than men in each age group, and that the number of women with eye disease is two to three times greater in older age groups (over 56 years) than the number of men. This is due to the 1.2 to 2.1 times greater proportion of women in these age categories of the population, as well as the 1.3 to 1.5 times greater prevalence of eye disease in women than men [12]. Furthermore, several age-related eye diseases, such as AMD, glaucoma, and cataracts, are more common in women [18], which is possibly also related to the decrease in oestrogen levels during menopause [20]. In Finland, the prevalence of eye disease was also found to be greater among women than men, although the disparity between the sexes was not as big as in Hungary [15]. In the United States, women have been shown to experience permanent vision loss or blindness at a higher rate than men [16, 17, 21]. Women were found to be disproportionately affected by open-angle glaucoma, accounting for 55.4% of all patients [19]. Women have also been found to be at greater risk of cataracts than men of the same age worldwide, and the disparity between the sexes has been shown to widen with age [22]. Based on these findings, both screenings and information on distribution according to sex are required.

According to our findings, more than 62% of the adult population in Hungary suffers from refractive errors. Our previous investigations found that around 9.3% of people with refractive errors have no distance vision correction or have the wrong glasses, implying that uncorrected refractive errors (URE) are common and affect approximately 465,474 adults in the country [14]. Uncorrected refractive errors are the second biggest cause of moderate visual impairment (MVI) and early visual impairment (EVI) in Hungary, accounting for 23.9% and 40.7% of cases respectively [6]. The percentage of people with incorrect glasses was found to range between 28.9% and 33.1% [14]. This issue needs to be addressed through targeted population awareness campaigns that provide people with the essential medical knowledge.

In our present research sample, as well as in national population estimates, myopia was roughly twice as common as hypermetropia and was found to affect both sexes between the ages of 18 and 55. Over the age of 56, a greater proportion of women than men are affected. Myopia is more prevalent in the younger generation (18–44 years old), while hypermetropia is more prevalent in the elderly (60–74 years old).

Worldwide, it is generally acknowledged that the prevalence of myopia in younger generations is increasing dramatically, reaching 90–95% in East Asia and around 60% in Europe, including Hungary [11, 23–26]. The key causes include less time spent outdoors and more time spent looking at computer, tablet, and smartphone screens. It is crucial to publicise these alarming facts and to promote a healthy lifestyle among children, including more time spent outdoors and less close-up screen usage [26, 27].

Compared to earlier statistics, the number of people with myopia in Hungary has increased dramatically [11]. Over the last decade there has been a substantial improvement in our knowledge of the causes of myopia as well as of the control intervention options available to prevent the onset and progression of myopia. A wealth of material on excellent management methods has been made available [26]. As a result, the time has come to develop and implement a national anti-myopia management programme [28]. There are various good and effective foreign models that might serve as a foundation for the construction of a Hungarian myopia programme [28]. The WHO has released a myopia toolkit to aid in the development and implementation of such programmes [29].

CONCLUSIONS

The huge proportion of the Hungarian population affected by eye disease or refractive errors underscores the need to
develop and implement an effective national strategy and targeted programmes to prevent visual impairments.

Authors’ contributions: JN was responsible for analysing the data, interpreting the results, updating the reference list and writing the report. ZZN and BT provided feedback on the report and contributed to writing the report. TD was responsible for extracting and analysing data. GD and IB were responsible for designing the survey and conducting the data collection.

Ethical approval: The MÁESZ studies were conducted in accordance with the Declaration of Helsinki [10]. MÁESZ carries out its activities based on the approval of the National Public Health and Medical Officer Service (operating licence number: NTSZ 2380-5/2010) [10].

Conflict of interest: The authors declare no conflict of interest. No financial support was received for this study.

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NA.

LIST OF ABBREVIATIONS

AMD age-related macular degeneration
D diopitre
DR diabetic retinopathy
EVI early visual impairment
MÁESZ Comprehensive Health Protection Screening Programme of Hungary
MVI moderate visual impairment
RAAB Rapid Assessment of Avoidable Blindness study
SEQ spherical equivalent
URE uncorrected refractive errors
WHO World Health Organization

REFERENCES


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